

OPEN POSITION FOR A MASTER 2 THESIS

Sodium titanates for battery applications

For the last ten years, research around sodium batteries has greatly accelerated. These batteries are indeed considered as a possible alternative to lithium batteries, especially for stationary applications for which the increase in the mass of components due to the use of sodium rather than lithium is not problematic. In the vast majority of sodium batteries currently studied, the electrochemical storage of energy involves sodium ion intercalation reactions at the electrodes. **This project involves the research of new materials with the CaFe_2O_4 -structure type to be used as negative electrodes for sodium batteries.**

The project is primarily a basic research project to study the deintercalation and electrochemical intercalation of sodium in a family of oxides little studied so far. The objectives of the project are:

1. **Synthesize NaTi_2O_4** using different synthesis conditions to control titanium oxidation state and the particle size.
2. **Use the synthesized materials as the electrode material in a sodium battery** to evaluate the electrochemical performance depending on the particle size.

TECHNIQUES USED

- Synthesis : solid state reactions in controlled atmospheres
- Battery assembling and cycling
- Structural and micro-structural analyses: powder X-ray diffraction, scanning electronic microscopy

HOST LABORATORY

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